

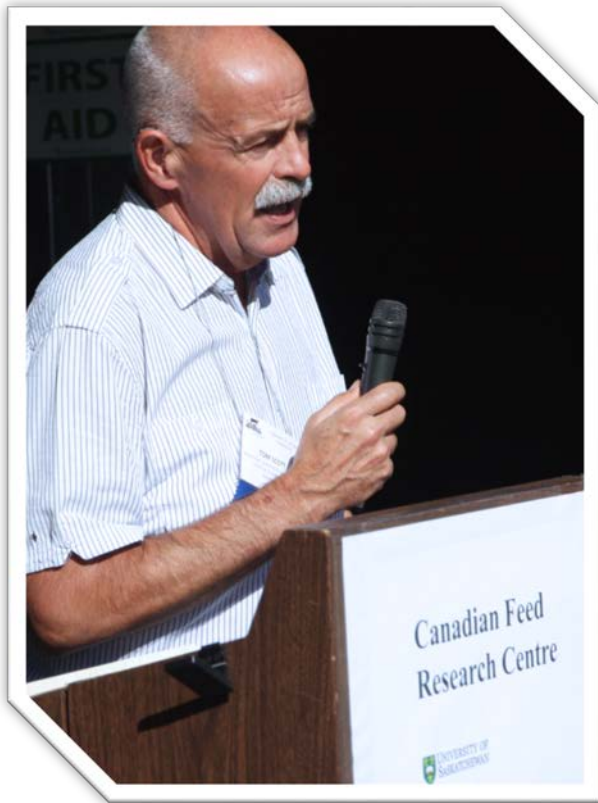
Project pioneers NIRS-guided grain processing

by Kieran Brett

With funding from ACIDF and ALMA, this researcher initiated a new way to evaluate feed ingredients for enhancements that could be made during processing.

For anyone who grows, buys or feeds grain for livestock, Near Infrared Spectroscopy (NIRS) technology has changed the rules of the business.

When chemical composition of grain – and hence its potential feed value -- is accurately estimated, the economic value of that grain quickly comes into focus.



As Tom Scott, pictured left, has observed the NIRS revolution, however, he believed the technology could do much more. Scott, Saskatoon-based Research Chair in Feed Processing Technology at the Canadian Feed Research Centre (CFRC), notes that most feed mills only NIRS-scan feed ingredients at the *start* of their process. The ingredients change as they are subjected to grinding, conditioning, mixing, pelleting and other actions.

Scott's idea was to use NIRS not just to evaluate grain coming in the door, but to estimate nutrient variability and suggest adaptations to feed ingredients *during* the production process.

Equipment design a first for North America

In 2014, Scott secured funding from the Alberta Crop Industry Development Fund (ACIDF) through the \$8 million Feeding Initiative funded by Alberta Livestock and Meat Agency (ALMA). After considerable research, he settled on an

NIRS system costing \$300,000.

“We wanted to do something no one else was currently doing,” he says. “We are the first group in North America to install a commercial in-line NIRS system to measure the variation of feed ingredients.”

The in-line NIRS system was installed in April 2015 at CFRC's North Battleford facility operated by the University of Saskatchewan. The system can monitor six different probes up to 100 meters from the computer simultaneously and capture a scan at each point every three to five seconds. This delivers a torrent of real-time measurements that can be used to calculate variation in nutrients and physical process requirements.

As Scott explains, this system will ultimately be able to identify improvements on the go. This capability, still in its infancy at the CRFC facility, could eventually transform grain processing far and wide.

What's at stake? In other NIRS applications, such as those at a feedlot or a hog barn, performance improvements of just a few percentage points are eagerly embraced. In-line NIRS could do much more.

“We did one study with different sources of wheat in Western Canada and changed how each one was processed,” says Scott. “We saw variations in animal performance, in one case an improvement of 32%. If you could increase the value of a diet just by changing how it's processed, that would have a huge economic value.”

Small changes can net big returns

Scott notes that current NIRS research doesn't fully address the impact of processing on feedgrains, nor does it adequately deal with variabilities in grain. These are two areas where he believes this equipment can provide more specific information, leading to discoveries that could significantly improve feedgrain usage *and* animal performance.

“We're one of the few groups targeting this area,” he says. “One wheat source is not representative of all wheat sources. If we can adapt grinding or processing based on individual grain loads, in order to get the best performance uniformly at the end, that is the ultimate goal.”

While such specialized equipment is expensive, Scott feels potential processing improvements more than justify the up-front investment.

“Small increments in change to a diet can save a fair amount of money,” he says. “In Canada, we produce 30 million metric tonnes of feed each year. If we could get the same animal performance with 29 million metric tonnes, that million-tonne savings would definitely improve the sustainability of the industry.”



After decades working at the intersection of academic research and livestock performance, Tom Scott and John Smillie, manager, Canadian Feed Research Center, pictured left, will continue to advance NIRS technology and pursue its benefits.

“We have some really neat tools to work with,” he says. “We feel there are many different options for potential savings

just by understanding variability of key ingredients in Western Canada and how they respond to different processes. It's extremely exciting.”